Report Out

June 10, 2016

Breakout Out Group:

In-situ Measurements

NIST

Desired AM Capabilities/Technologies

- High-speed, high-resolution in-situ measurements
- Quantitative imaging of build process at the layer level
- Optimization of molecular structure
- Automated in-process defect detection
- Real time data interpretation to support in-situ process control
- Machine learning can be applied
- Self-sensing materials, leading to self healing materials
- Build-to-build consistency
- Have a measure for online characterization defects and interfaces

Top-Voted Challenges/Priority Topics

- Lack of existing real-time process measurements (spatial, temporal)
  - Develop novel measurements for real-time feedback throughout volume during printing, provide to close-loop control
- Lack of big data analytics for AM
  - Reduction to a quality measure; relate to process model predictions
- In-situ control and model integration
  - Closed-loop integration of advanced sensing and model for informed control
- Lack of in-situ imaging modalities
  - integration to the equipment, tailorable to instrument geometry